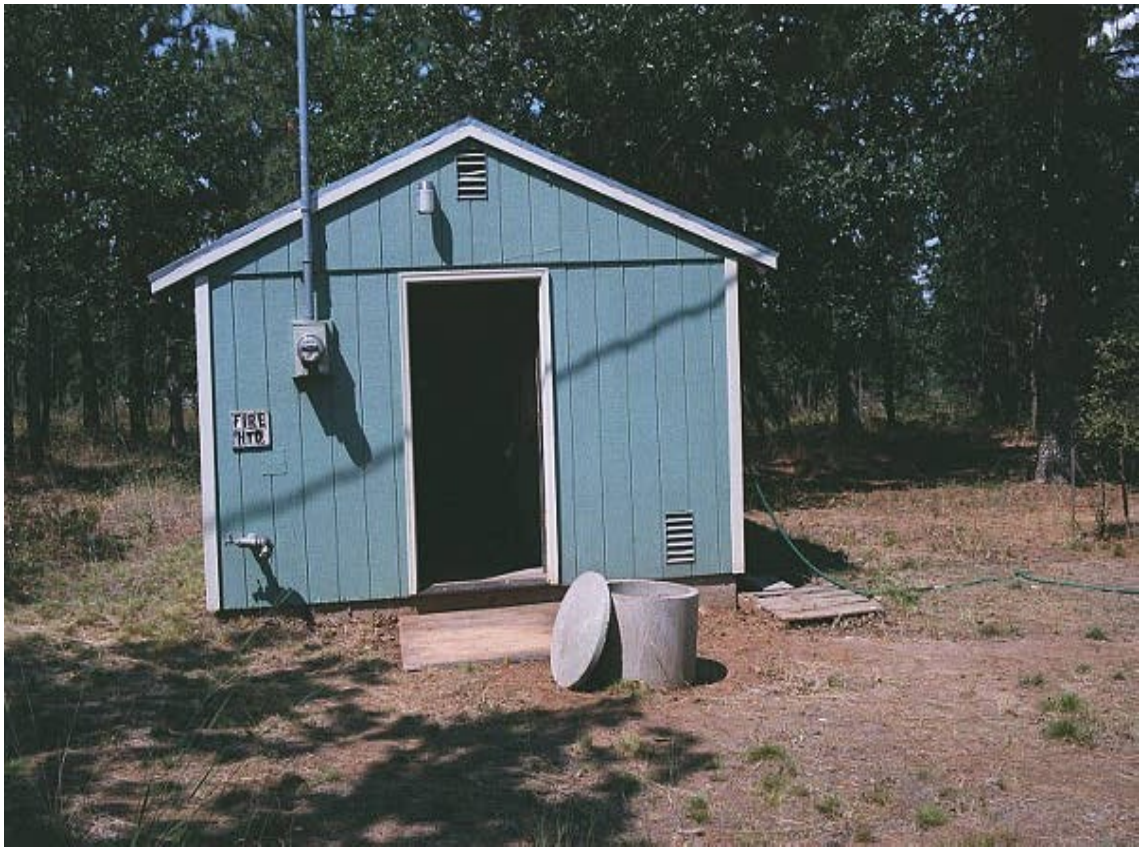
Group B Project Report

Safe Drinking Water For Small Communities

November 2003



Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

DOH PUB. #331-243

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"This program has been some of the best public health that we have been able to accomplish in the Group B program thus far. The one-on-one education that happens on-site with the operator, the providing of a current water system status report, the offer to assist folks in a preventative manner all add up to excellent public health."

—Local health staff reflection

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Mary Selecky
Secretary of Health

Rich Hoey
Acting Director, Office of Drinking Water

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Director's Message

I am pleased to present a summary of the outcomes of the first phase of the Group B Project Report: Safe Drinking Water For Small Communities. This report represents nearly two years of work with Group B water systems by 31 local health jurisdictions across the state.

While serving only a small percentage of the state's population, small Group B public water systems generally have more uncorrected problems, and are most commonly implicated in waterborne disease outbreaks when such outbreaks are documented.

This project funding enhanced the ability of local health jurisdictions to visit small water systems and have a higher level of involvement with the owners of these small systems.

During the course of this project 3,612 Water Facility Inventory forms were updated and 3,230 site visits were conducted by local health staff. Many of these systems had not been visited in years, if ever before. The findings from these visits document significant problems involving very basic public health protection measures that were not in order, and very basic water quality monitoring tests which were not being done.

The survey findings have resulted in many basic public health protection problems being corrected, and set the stage for prioritizing further follow-up actions and assistance to ensure customers of these small water systems have access to safe and reliable drinking water – which may not have been the case in years prior to these efforts.

Protecting the health of the people of Washington State by assuring safe and reliable drinking water is a cornerstone for public health protection for a healthy, viable community. We look forward to continuing our work with our local health partners across the state to ensure the provision of this basic health service for all residents of the state.

Rich Hoey, Acting Director
Office of Drinking Water
Washington State Department of Health

Background

Safe drinking water and good health are critically linked. The Center for Disease Control reported that between 1999-2000, there were 39 waterborne disease outbreaks in the United States: 2,068 illnesses, 122 hospitalizations, and 2 deaths. Eighteen of the 39 outbreaks were linked to water systems with less than 15 connections – not subject to the requirements of the federal Safe Drinking Water Act (SDWA).

In Washington State, five million residents (84% of the state's population) are served by more than 16,800 public water systems. Most (82%) are served by 4,200 Group A systems, which are subject to the SDWA, and about 125,000 people, or 2% of the state's population, are served by 12,600 Group B systems, which are not subject to the federal SDWA. About 600,000 people (10% of the state's population) use private wells governed by local ordinances. No information is available on the remaining six percent.

Group B systems serve between two and 14 connections. Though they are exempt from the SDWA, they are subject to state drinking water regulations and local ordinances. Assuring safe and reliable drinking water from all public water systems is a priority of the Washington Department of Health (DOH). However, the state and local governments do not have the resources necessary to fully regulate every water system with two or more connections in the manner envisioned in law. Based on that premise, the Washington Water Supply Advisory Committee submitted recommendations for defining and overseeing Group B water systems in its July 2000 report to the Department of Health titled "Washington's Drinking Water Program: Recommendations Regarding Scope and Funding."

A key outcome of these recommendations was the department's budget request to the 2001 Legislature which resulted in funding for a two-year project to obtain accurate information on Group B water supplies. A budget enhancement was received and $1.4 million was contracted to local health jurisdictions to collect information on the status of Group B water systems across the state. Activities focused on water systems with five or more connections and had three principal goals:

1) Obtaining accurate water system information on these systems via an inventory check,

2) Identifying public health risks and needed corrections through site visits and determining status and compliance with routine water quality monitoring requirements, and

3) Informing water system operators of needed corrections and required water quality monitoring requirements.

This report summarizes the project scope and findings, and provides recommendations for future Group B water system oversight activities.

Process / Timeline

The DOH Office of Drinking Water, with participation by environmental health directors in local health jurisdictions (LHJs) around the state, developed a scope of work and a funding method to disperse funds to LHJs during the 2001-2003 biennium. Based on the amount of funding available and the need to make the scope of work manageable for our local health partners, the activities focused only on Group B water systems with five or more connections – about 3,379 systems. Of the 34 LHJs in the state at the time, 31 covering 36 of the 39 counties participated in the work (see Appendix 1).

The following timeline was established to take the program through the biennium:

- July 2001 - Developed action plan, funding proposal and contracting strategy. Met with Washington Environmental Health Directors' Water Committee.
- Aug 2001 - Refined action plan and funding proposal. Finalized reporting requirements and performance measures.
- Sept 2001 - Dec 2001 - Contracted with local health jurisdictions.
- Jan 2002 - June 2003 - Work underway at local level. Quarterly reporting to DOH.
- Jan 2003 – Presented an interim report to the State Board of Health (SBOH).
- July 2003 – Work on project completed.
- October 2003 - Final report to Washington Water Supply Advisory Committee

Project Funding

The Office of Drinking Water used the department's consolidated contract process to transfer funds to LHJs.

Since one of the main goals with this funding was to obtain accurate information on Group B water supplies in the state, LHJs were allocated a baseline amount of funding ($5000) for each county in their jurisdiction. This baseline funding supported efforts to inventory water systems not currently found in the DOH drinking water database.

Remaining funds were allocated to LHJs on a prorated basis, based on the number of targeted Group B water systems in each individual county (per the DOH drinking water database). LHJs were expected to update Water Facility Inventory forms, conduct site visits, and submit reports to the Office of Drinking Water for each system on the list. Drinking Water provided a list of systems, a Group B site visit checklist, and a quarterly report form to each of the local health jurisdictions. Each quarter LHJs received $355.00 for each site visit conducted.

Results

At the beginning of this project, there were 3,379 Group B water systems in the DOH database with five or more connections. At the completion of the first task—checking the accuracy of our data—the number of systems increased to 3,497, but by the end of the project there were 48 fewer systems identified, bringing the total to 3,331. Reasons for the change were that some systems were identified as Group A systems, some no longer existed or had connected to a Group A system, had never been developed, or had fewer than five connections.

Water Facility Inventory Updates

LHJs submitted a Water Facility Inventory form for each water system to update the Office of Drinking Water's database with accurate information. During the project, 3612 updated Water Facility Inventory forms were submitted. Updates ranged from no changes in system information to extensive changes such as new system ownership or source information. ***Challenges:*** This task proved to be extremely time-intensive for staff due to constant changes in water system contacts.

Water System Site Visits

LHJs contacted water systems on their respective lists, requesting to conduct a voluntary site visit. Site visits were instrumental in helping LHJs identify high public health risks associated with these water systems. The site visits also gave local health staff an opportunity to educate purveyors about water quality monitoring requirements and to offer technical assistance as needed.

Over the course of this project, local health staff conducted 3,230 site visits – about 95 percent of the total number of systems targeted. About five percent, or 136 systems, either refused to participate in the site visits or could not be contacted by LHJ staff despite repeated attempts.

The general trend observed during the site visits was that most systems had one or more deficiencies that pose a risk to public health. These were often related to the lack of operator knowledge of the operation and maintenance of the water system, or of the state/local regulations for Group B water systems. The following top six deficiencies were noted statewide:

1. Lack of properly constructed and screened well vents (53%)
2. Inadequate water quality monitoring (45%)
3. Biological and chemical contaminants located within 100 ft. of source (31%)
4. Lack of sampling taps at the wellhead (30%)
5. Open storage reservoirs (Approx. 26% of systems have atmospheric storage reservoirs- 49% had unprotected openings.)
6. Lack of sealed well caps (21%)

Lack of properly constructed and screened well vents (53%)

Proper venting is key to preventing contamination being drawn into the well. This deficiency coupled with the **lack of sealed well caps (21%)** means that a significant number of the targeted water systems in this project are subject to potential contamination of drinking water.

Inadequate water quality monitoring (45%)

The high incidence of this deficiency is a significant finding since Group B systems are only required to collect a coliform sample once each year, and a nitrate sample once every three years. By failing to meet even the minimal monitoring requirements, 45 percent of the systems statewide have very little indication of the quality of water they are providing to their customers.

Biological and chemical contaminants located within 100 ft. of source (31%)

Potential sources of contaminants within 100 feet of a drinking water source pose a significant health risk to consumers through pollution of groundwater and ultimate contamination of drinking water. Frequently observed contaminant sources included manure piles, compost piles, livestock enclosures, grazing animals, septic tanks and drain fields, sewer lines, underground storage tanks, gasoline, propane, and diesel storage, liquid fertilizer, herbicides, pesticides, insecticides, and house paints.

Lack of proper sampling taps (30%)

Without a suitable sampling tap at the source, it is impossible to know the quality of water at the source and it is extremely difficult to track down and identify any potential sources of contamination.

Open storage reservoirs (~13%)

Open storage reservoirs can be ready points of entry for contaminants (birds, bats, rodents, etc.) into the water system. While only 26 percent of the systems used non-pressurized atmospheric storage reservoirs, about 49 percent of these reservoirs had unprotected openings that could easily serve as points of entry for contamination. There have been cases of waterborne illness traced back to open storage reservoirs. In addition to unprotected openings, a wide variety of unacceptable storage tanks were found to be in use such as old wood tanks, preformed concrete tanks originally intended as septic tanks, and metal tanks that had not been intended for water storage

Other unsafe conditions

In addition to the deficiencies noted above, other unsafe conditions observed included:

- Unsafe sources such as:
    - switching from a groundwater source to a highly vulnerable surface water (lakes, etc) source without approvals
    - shallow dug wells
    - surface water from creeks
    - poorly developed or unprotected springs which were often unfiltered and had no disinfection
    - unapproved sources / treatment systems in place
    - old inactive sources that continue to be connected to systems
- Absentee water system owners – no one in responsible charge of the water system
- Lack of knowledge and experience of water purveyors.
- Evidence of vandalism and a general lack of security
- Hazardous conditions in pump houses such as bare electrical wires, blocked access to water system components, and rodent infestations
- Known or obvious risk of wellhead contamination from flooding

Challenges

LHJs expended considerable efforts in contacting Group B water systems for inspections, and in some cases were unable to reach a water system owner/operator or were refused permission to conduct a site visit due to a lack of authority to conduct Group B site visits. This resulted in delays in meeting their contract obligations with the Office of Drinking Water. In some cases, The Office of Drinking Water sent a letter to the water system requesting that they allow the LHJ to conduct the site visit – which proved helpful in gaining cooperation by some systems but not all (see Appendix 2).

Benefits

Many Group B systems had not received critical reviews and assistance in decades. Achieving our objectives and getting the results we needed – identifying common public health risks and working with operators to ensure safe and reliable drinking water to their customers – are the most significant benefits of the project. We've also gained more accurate information about the targeted Group B water systems and are better positioned to continue improvements with Group B water systems that could serve as a focus for future education and technical assistance.

The funding for this project arrived at a very beneficial time as a number of LHJs considered discontinuing their drinking water program because of budget cuts. Two jurisdictions facing severe budget restrictions used the funding to continue drinking water activities for Group B systems.

The following are some of the benefits we commonly heard from local health:

- Improved ability to communicate public health concerns and requirements to operators
- Establishing positive working relationships between local health offices and water system operators
- Establishing contact with new owners/operators and educating them on state/local requirements
- Ability to provide hands-on assistance and education to receptive water system operators
- "Putting a face on government" during field visits was appreciated
- Updating information enabled LHJs to be more effective with reminder postcards for water quality testing
- Enhanced in-house expertise and capacity of staff

The reasons most often cited for water system deficiencies were:

- Purveyors (often a homeowner association representative) with little or no water system experience trying to understand the operations, requirements, risks, and complexities of running a small water system.
- Little comprehension by the water system owner/ operator of the system design and history, or compliance obligations.

Recommendations from Local Health Jurisdictions

For most LHJs this funding is vital for them to maintain local capacity to ensure safe and reliable drinking water on Group B systems in their jurisdictions. Based on site visits and communications with water system owners/operators, LHJs offered the following recommendations:

- Establish a stable funding source to support local drinking water programs.
- Revise Chapter 246-291 WAC to include the authority for conducting sanitary surveys and increase monitoring requirements on inadequate sources.
- Maintain the ability to:
    - Enable local health jurisdictions to develop a technical assistance, training and education program to help correct problems discovered during the site visits.

- Incorporate a clearly defined compliance element / enforcement strategy to bring recalcitrant systems into compliance.

Next Steps

The 2003 Legislature appropriated $1.4 million for the 2003-2005 biennium to continue assessing the status of Group B water systems. In the second phase of the project, local health staff will be focusing on Group B systems with 3 or more connections. Of the 35 LHJs currently in the state, 32 covering 36 of the 39 counties will be participating in the work. Activities will be based on similar goals to the first phase of the project:

- Ensuring that water systems are properly inventoried;
- Assessing current status and identifying critical public health risks through site visits;
- Conducting follow up site visits and/or providing technical assistance in making improvements to address areas of critical public health risks; and
- Informing system operators of routine water quality requirements and track compliance.

Conclusion

Group B systems, generally serving two to 14 connections, are subject to state law and local ordinances regarding water quality and operations. However, with over 12,000 of these systems statewide and budgetary restraints, many of these have been overlooked and in numerous cases have never been reviewed. Subsequently, very little information was available on their condition and their ability to supply safe and reliable drinking water to customers. The outcome of this project was that the condition of Group B systems with 5 or more connections is better understood.

A large number of systems were found with significant problems. Often these problems were the direct result poor operator knowledge and/ or experience. If Group B systems are to be effectively regulated in the future, a number of issues need to be addressed. These would include increased resources for technical assistance, training, compliance, and potential revisions to the current WAC to clarify authorities for conducting sanitary surveys and increased monitoring requirements when needed.

Appendix 1: LHJ Group B Project Update

# County	Total Bs >=5 conn (DWAIN) 7/01/01	Revised LHJ #s 4/01/02	# of Site Visits Finished	% of Site Visits Completed	# of WFI updates	Approximate $$ Spent	Total Funding
Adams	19	21	19	100.00%	30	$11,745.00	$11,745.00
Benton/Franklin	83	55	62	74.70%	80	$32,010.00	$39,465.00
Chelan/Douglas	101	89	101	100.00%	102	$45,855.00	$45,855.00
Clallam	82	82	67	81.71%	67	$28,785.00	$34,110.00
Columbia	0	0	0			$5,000.00	$5,000.00
Cowlitz	30	28	29	96.67%	39	$15,295.00	$15,650.00
Grant	72	67	65	90.28%	127	$28,075.00	$30,560.00
Grays Harbor	46	47	40	86.96%	41	$19,200.00	$21,330.00
Island	197	211	201	102.03%	244	$76,355.00	$74,935.00
Jefferson	43	51	41	95.35%	41	$19,555.00	$20,265.00
King	418	391	418	100.00%	492	$153,390.00	$153,390.00
Kitsap	251	334	242	96.41%	242	$90,910.00	$94,105.00
Kittitas	44	49	44	100.00%	47	$20,620.00	$20,620.00
Klickitat	17	17	14	82.35%	14	$9,970.00	$11,035.00
Lewis	125	151	124	99.20%	159	$49,020.00	$49,375.00
Lincoln	12	12	12	100.00%	15	$9,260.00	$9,260.00
Mason	223	223	214	95.96%	218	$80,970.00	$84,165.00
Okanogan	95	113	76	80.00%	76	$31,980.00	$38,725.00
NE Tri-County	43	44	42	97.67%	42	$29,910.00	$30,265.00
Pierce	553	552	552	99.82%	505	$200,960.00	$201,315.00
San Juan	69	85	71	102.90%	82	$30,205.00	$29,495.00
Skagit	52	49	44	84.62%	56	$20,620.00	$23,460.00
SW Wash. HD	98	96	91	92.86%	186	$42,305.00	$44,790.00
Snohomish	133	140	133	100.00%	142	$52,215.00	$52,215.00
Spokane	55	55	44	80.00%	44	$20,620.00	$24,525.00
Thurston	242	271	230	95.04%	220	$86,650.00	$90,910.00
Wahkiakum	4	3	4	100.00%	4	$6,420.00	$6,420.00
Walla Walla	20	18	17	85.00%	17	$11,035.00	$12,100.00
Whatcom	74	74	72	97.30%	72	$30,560.00	$31,270.00
Whitman	10	10	10	100.00%	10	$8,550.00	$8,550.00
Yakima	168	168	151	89.88%	198	$58,605.00	$64,640.00
Totals	**3379**	**3506**	3230	95.59%	3612	$1,326,650.00	**$1,379,545.00**
		[3331]*					

**** 3331 is the current number of Group B systems in Sentry because of systems that have been inactivated as they no longer exist or have been connected to Group A systems***

Appendix 2: Letter to Group B Systems

March 10, 2003

_____
_____
_____
_____, WA _____

REF: Group B Oversight Program

Dear _____;

The purpose of this letter is to request your cooperation in allowing the _____ County Health (District/ Department) to conduct an assessment and records review of your Group B public water system.

As the owner/ operator of a Group B public water system you are required under Chapter 246-291-240, WAC to provide an adequate quantity and quality of water to your customers in a reliable manner. As the department responsible for administering these rules, it is the Office of Drinking Water's responsibility to conduct periodic reviews of Group B water systems to ensure that customers are receiving a safe and reliable source of drinking water. One of the methods that we use to conduct these reviews are a water system assessment and a records review.

While the Office of Drinking Water has the ultimate responsibility to conduct these reviews, there are over 3,300 systems statewide to review. With such a high number of systems statewide to assess, we have delegated the responsibility of reviewing Group B water systems to a number local health jurisdictions. The department has a contractual agreement with _____ County Health (District/ Department) to administer specific roles and responsibilities for the oversight of water system requirements under Chapter 246-291-030, WAC. Part of this oversight is to conduct system assessments and record reviews.

With this background, please contact the (name and phone number) at the _____ County Health (District/ Department) to arrange for a system assessment and records review of your system. There is no charge to you or your system for this review and no follow-up or enforcement actions will be required. However, the failure to participate in these reviews could eventually result in your system being reclassified as inadequate under the provisions of Chapter 246-291-130, WAC.

If you have any questions, concerns or need more information, please feel free to contact me at (360) 236-3158.

Sincerely,

Dennis P. Campbell, R.S.
Office of Drinking Water
Washington State Dept. of Health

Appendix 3: Local Health Jurisdiction Observations and Comments

Local Health Jurisdictions were given the opportunity and encouraged to provide additional feedback when submitting their quarterly reports. The following is a compilation of observations and comments submitted during the project.

Miscellaneous LHJ Observations During Site Visits

- Loose fittings, gaps for wiring or unbolted caps providing the potential for unwanted access to many wells.
- A well in danger of damage by heavy equipment as a new access road used by heavy equipment and transport trailers was found within a few feet of the well.
- Buried and poorly sealed reservoir subject to potential contamination.
- A well, redrilled after the February 28th earthquake, had no new pump test data or water quality tests.
- Vandalized equipment unknown to operator.
- Two systems constructed differently from the approved plans. Major deficiencies of public health significance found with both systems:
    - cross connections,
    - flooded control and operational equipment,
    - yard hydrants installed as sample taps,
    - coliform problems, and
    - a well pump failure.
- System chlorinates prior to bacteriological sampling their dug well. Bacteriological samples were unsatisfactory. Storage was poorly protected.
- Creek source with no filtration and no chlorine monitoring.
- Dug well with poor setbacks, not current on bactis., unmonitored chlorination and no filtration.
- No monitoring information and no knowledge of the system.
- System batch chlorinates prior to bacteriological sampling. Bacteriological sample was unsatisfactory.
- Well and storage tank not secure from contamination. No bacti since 1993.
- A second well was added prior to approvals. Water quality unknown.
- Systems were not current for monitoring bacti or nitrate.
- Added chlorination and filtration without approvals. Chlorinator nonfunctional during site visit.
- The lack of current sampling and general maintenance were commonly encountered problems .
- A well was of substandard construction, drilled by a non-certified driller, and located with significant infringements on the SCA had been drilled as a replacement source. Also, the system had installed an in-line chlorinator on the water supply.
- Identification of an existing unutilized hand dug well next to a resort. The well was covered and a lock installed. Follow-up is ongoing in promoting decommissioning
- Technical assistance was provided to a Group B system with a history of unsatisfactory results. Small lot sizes and setback concerns eliminated alternative well sites. The purveyors was

convinced to bring in a well contractor and "rebuild" the existing dug well. There have been no detected coliforms since.

- Absentee property owner, person left in charge had no knowledge/experience, or resources to operate water system. Numerous deficiencies noted:
    - evidence of vandalism or inadequately modified/repaired system components
    - pump deliberately runs 7/24.
    - high system pressures w/o relief valves,
    - leaking connections
    - potential cross-connections
    - Active source unprotected and vulnerable, and
    - Inactive well connected to system.
- 13 active connections. original spring source & reservoir destroyed by landslide. Well source, and new storage system installed in 1996. No review or approval for new system sought by purveyor. No water quality sampling has been performed on new source.
- The well head is less than 100' from public and private roads. Well house in poor condition, with one pressure tank rusty and empty, the other pressure tank waterlogged. Both the well house and well head infested with mice.
- The well casing is buried with dirt under a water meter box.
- Detached garage and a public road are less than 100 feet from well. Allowed by waiver approval of King County Water Review Board provided no contaminants are stored in garage, and is noted by covenant on property title.
- Existing garage and house located within 30 feet of the well containing toxic materials. The plumbing stub and sewer serving the house is less than 50 feet to the well. Well head and pressure tank are located in a concrete lined vault approximately 7 feet below grade. The vault has a tight fitting roof with no apparent leaks, but does not appear to have any drains.
- Garage with chemicals, and septic system less than 100 feet from well. Structure location (existing) and septic system had reduced setback approved via waiver on 5/10/82.
- Well head is 75 feet from the edge of a public road, 62 feet from the road right of way, and less than 100 feet to a private road. The well site was approved in October 1977 as the well head is located up-gradient from the public road. There is a spray tank with some unknown liquid stored in the well house less than 10 feet from the well head.
- Tightline from RV dump station less than 100 feet from well head. Animal enclosure (horse) less than 30 feet from well head.
- An inadequate surface water system serving 10 houses. Source is a year round stream via 2 collection boxes with some screens for primary solids removal. 2 "spa-like" chlorine tablets are added to the 2nd box on Wednesdays and Sundays. All homes are gravity served. The collection point is adjacent to (200 –300 feet) a large sand and gravel pit on Hudson River.
- Cans of fuel oil, gasoline and paint stored in many well houses.
- Screened well vent broken off leaving an opening in the well cap. Also, a "quarter sized hole in an access lid in the buried reservoir with the lid being just above grade.
- Water system connected to an adjacent Group A water supply and pumping water into a storage reservoir. The water wells originally serving this Group B water system have been capped off. Information sent to regional engineer for King County on intertie with this Group A system.

Additional Benefits of the Project

- Established contact with new owners/ operators of systems where ownership had changed. Provided the opportunity to educate and inform new operators of O & M and requirements.
- Additional reminder to owners of systems previously surveyed about deficiencies still not corrected. Opportunity to assure corrective action for deficiencies of public health significance.
- Updates of WFIs, files, and databases regarding ownership, system contacts, etc. Enabled LHJ to be more effective with quarterly "reminder postcards" of when water quality tests are due.
- Opportunity to discuss well and water system security.
- Able to purchase a digital camera and accessories to better document findings.
- Education of operators, WAC 246-291 and other handouts were offered and given.
- Able to provide assistance with a bacteriological contamination problem.
- Able to provide assistance with a hydrocarbon contamination problem.
- 2 systems were found to be a Group A systems, no bacti since 1995
- Education, WAC 246-291 and other handouts were offered and given.
- Able to provide assistance with a bacteriological contamination problem.
- Able to provide assistance with a hydrocarbon contamination problem.
- Able to identify the correct system contacts, facilitate minor corrections to deficiencies identified, and create an awareness that these systems are regulated and expected to provide safe water.
- Utilized a GPS in mapping the sources of water systems and tagging all wells not tagged at the time of the drill. Established a GPS generated database and map of the Group A water supply sources. Adding Group B wells resulted in a comprehensive assessment of the public water supplies in the County. Will enable a rapid and effective public health assessment of potential and immediate impacts of contamination events or of compromised groundwater quality.
- Most water system representatives have been very receptive to the site visits. Continually heard the statement "putting a face on government" during the field visits. Helped to develop a positive working relationship with purveyors so they have a local contact when they need assistance
- Site visits provided more water system data and provided water system managers with important information regarding proper management, water quality monitoring requirements, and other information to help provide safe and reliable drinking water.
- Provided written material on regulatory compliance and water quality monitoring. Helped reduce a lot of confusion out and people were truly relieved when the requirements are clearly spelled out.
- Raised the visibility and priority for conducting survey inspections of Group B water systems.
- Many Group systems have not received critical reviews in decades. With systems existing for such long periods of time, the finding is that the current operators have assumed responsibility for reasons other than training, aptitude, or commitment. They may possess little comprehension of the system design and history, or compliance obligations.
- Effected some improvements in water system construction
- Provided an opportunity for information dissemination on Group B monitoring requirements, proper coliform monitoring, cross connection control, general wellhead protection, and additional sources of available assistance (Evergreen Rural Water; certified labs, etc.)
- Updated information especially the contact and number of active connections

- Assisted purveyors, sometimes homeowners with little or no water system experience, to understand the operations, requirements, risks, and complexities of running a small water system
- Update of system records and computer tracking: WFI and WDOE well tagging
- Bringing systems into compliance with sampling and testing
- Updating GIS system: locating wells, service areas, and connection to the WFI information on the county internet site
- Adding pictures to county files; helpful when diagnosing water quality problems over the phone ("see the missing vent; is there still an opening in the sanitary well cap?")
- Added information to files concerning the current condition of the water systems. E.g.: two systems were found that were constructed substantially different from the approved plans. System components were installed in vaults subject to flooding, a likely cause of a coliform violations. The systems are being reconstructed per the approved plans. The info added to files is also helpful in making "adequacy determinations" for new connections (over connected, serious deficiencies, current contact persons, etc…)
- Communication of public health concerns and operator responsibilities to water system operators during the surveys. Serious potential health concerns were shared with operators who were unaware of the problem(s), and this appeared to motivate the operator to correct the problem(s) where possible.
- Updated records on Group B systems include a digital picture record of each water system for answering future questions on these systems.
- Developed a sense of common problems associated with Group B systems that will help focus future education/training efforts with the operators.
- Enhancement of in-house expertise and capacity through completion of these surveys by staff.
- Through the assessment process issues of concern could be identified and addressed.
- Information from site visit is being utilized in a legal action against a non-certified driller. The ultimate results are a safe water supply for the users and a reduced potential for contamination of the local aquifer.

Challenges

- One system denied access to property for the survey even though they had poor bacteriological history. They noted we had no legal authority to require.
- Experience indicates that dug wells and surface sources are inadequate sources. A campaign to move srom thr to a better source should to be implemented with Group B water systems state wide. It should include, at minimum, an increase in monitoring for bactis and chlorine but additionally a BCA-like document that puts conditions and moves them in a direction with the potential of some enforcement.
- Old dug wells with UV treatment.
- Arsenic 18 ppb
- Chloride 214 ppm
- As the project moves forward, less and less cooperative water system purveyors will have to be addressed. Although this may be caused for a variety of reasons it is anticipated there will be a significant population who are aware their system is not operating or managed properly. The staff

time which will result from working with these types of owners and looking for creative solutions with little monetary support will be a challenge.

- there is an amount of anti-government sentiment in this county. Being refused access to survey a PWS systems is a concern. So far it has only happened once, but I'm sure there will be more.
- Outdated information on WFIs making contact with operators difficult.
- Water sources observed during site visits that were not on WFIs.
- 35% of the systems visited were obtaining water from springs.
- Surface water sources used and inter-tied to system
- Actual number of connections not updated on WFIs
- Lack of protection of the SCA
- As we move further in to the project we will be addressing less and less cooperative water system purveyors. Although this may be caused for a variety of reasons it is anticipated there will be a significant population who are aware their system is not operating or managed properly. The staff time which will result from working with these types of owners and looking for creative solutions with little monetary support will be a challenge.
- Absence of proper monitoring in 60% of systems visited.

What worked well during the project

- An introductory letter explaining the purpose of the site visit and a copy of the checklist: these quelled fears of the program being compliance oriented.
- Downloading GIS and property info prior to the site visit: we were able to easily record the well locations, service areas, and specific lots served directly onto GIS maps that were then sent back for entry/update of our GIS mapping and water system tracking (some of this is still in process).
- We purchased dedicated time from a very competent support person. She sent the intro letters, prepared files for site visits, programmed a tracking /report system, entered data, prepared reports, printed and saved pictures, and put the water system files back in good order.
- We were able to send a number of our on-site staff for training and then used some of these staff to do the site visits. The “cross-training” provides the department with more versatile staff.
- We purchased another digital camera and a bunch of memory sticks. We shared cameras but kept our own memory sticks and forwarded them with reports to our admin staff for picture retrieval and printing file copies.
- Review of the water file prior to site visits was helpful
- Setting up appointments prior to site visits was best due to access and questions
- GPSing all sources is a valuable tool for Environmental Health
- Digital photographs of Group B water systems makes for excellent long term record of water system equipment, and to troubleshoot or answer questions from water system users. These photographs also become excellent communication tools for building support for the program from Board of Health, and King County Council, community groups, other agencies, etc.
- Sharing of information with operators on conservation, purveyor responsibilities, and other handouts.
- Additionally, the inspections became a way to build communication and rapport with Group B water system operators. The field visits helped show the operators who were are, and provided a contact

with them outside the regulator framework which made the operators more open and helped communication to go well.

The drawbacks of the project

- Essentially revolved around funding, as the funding is transitory it is difficult to staff the project with permanent staffing. It would be ideal to have dedicated funding to hire personnel to focus on the Group B water supplies.
- The number of systems to be looked at was pretty high for the contract period.
- It did not really allow for the time needed to fully review system improvements and on follow up.
- Follow up to owners was not as good as could have been done (including tri-form to more easily provide copy of inspection to purveyor.)
- Synopsis of needed improvements along with Group B literature would have been more helpful to users. (Canned form language?)
- Set plan for follow-up for hand dug wells.
- We were disappointed in the glitch with funding that we did not discover until near the end of the project. Even though the contract and scope of work stated clearly that we had the flexibility to perform the work according to our staff availability, DOH contracts refused to pay for some quarterly "under-billings" (fewer that 49 reports for a calendar quarter) and "over-billings" (greater than 49 reports for a calendar quarter).
- There were a few systems that refused inspection and a few that obviously avoided contact.
- Sometimes obtaining access to the Group B well for inspection was troublesome. We made efforts to contact Group B water systems for inspections, and in some cases did not get a call back inspire of several messages. Some wells we did site inspections of unlocked well houses or happen to show up when the owner was there. The inability to always contact the operator made for some down time when we could not complete inspections and/or seemed to spin our wheels.
- The key item checklist did not provide for as complete inspection of the water system as the comprehensive evaluation of the Group B water systems we have been doing for a fee or under local capacity funding.
- Question number 19 part B could be rewritten to focus on the water system pump operation, pressure tanks etc. more directly. Sometimes the question was not answered because it appeared that part B focused on whether the ASME valve was properly working, and when there was not one present, the question was not answered as it appeared to be non applicable.

Recommendations for future funds

- Upgrade WAC 246-291 to provide authority for sanitary surveys
- Upgrade WAC 246-291 to provide authority for sanitary surveys and to increase dramatically the monitoring of inadequate sources and an enforcement strategy to move them to the best available source via a BCA-like plan.
- Upon completion of the assessments of the >5 connection water systems it is recommended that an assessments of systems with the <5 connection be pursued. Although 99% of the systems in the county are in compliance for Bacterial and Nitrate sampling requirements it is clear from the assessments there are still outstanding health issues associated with the water supplies. It is also recommended that the Legislature look at a funding mechanism to make public dollars available for small water system improvements.

Areas of Improvement assuming funding

- Establishment of funds for simple system improvements and training or contract for improvement i.e. G&O model **just for wellhead deficiencies**.
- Establishment of matrix for system designation to allow additional funding for working with grossly mismanaged systems or SMA requirement.
- Better coordination with the contract, scope of work, and consolidated contract payment methodology.
- More flexibility in the type of work to be funded in the next two year cycle.

Systems not inspected

- refused contact, did not show up for inspection
- refused multiple calls & appointments
- budget restraints (DOH would not pay due to contract/funding glitch; see "what did not work well" above)

General observations for group B water systems inspected by one LHJ:

- 35 approved; 36 provisionally approved; 23 Inadequate and 5 duplicate or abandoned Group B water systems were inspected this quarter with most of them being a ground water well source (90 Wells; 1 Surface source; 2 Springs; 1 Purchase source).
- Most of Group B wells, springs and surface source were not chlorinated supplies. (92 versus 2). Even for those two systems that were being chlorinated, only one was being operated although it was impossible to know how consistent it was being chlorinated depending on the operator to place tablets of chlorine in one of the stream source boxes on certain days with possible fluctuations in the dosage of chlorine as the tablets eroded.
- Approximately two thirds of the Group B water systems had atmosphere storage reservoirs (59 that had reservoirs versus 35 with out). Of those with storage, two thirds of them had adequately sealed reservoirs. (39 versus 14).
- Most Group B water systems inspected were not current on sampling for nitrate (76 water systems), and bacteria sampling (57 water systems were not current, 37 who were).
- Most of the Group B water sources visited during the quarter were not located in a pit (86 versus 4); had a sealed well cap (81 versus 7); used pressure tanks in the system (88 versus 4); had an ASME pressure relief valve (72 versus 15); had the well casing at least 6" inches or more above the floor of the well house (72 versus 16); were not metered (72 versus 22); and did not have a biological contamination source with in the 100 foot radius (81 versus 10). Twice as many wells with chemical contamination concerns versus biological (22 versus 10).
- 100 % of the Group B water systems that were wells were not subject to surface flooding of the casings.
- A majority of the Group B water systems did not have source taps (50 versus 37).